## CHECKLISTS FOR GROUND WATER MODELING AT HTRW SITES

A. Scope Devel	opment Checklist
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1. Are the modeling objectives stated? (Required)

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2. Are previous studies referenced and summarized? (Recommended)

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Previous field and modeling studies and sources of data are helpful in preparing for new modeling efforts. Provide the full reference for any previous known modeling studies or reports prepared for the site.

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3. Is the development of a site conceptual model specified? (Required)

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The conceptual model scope should include requirements to define geometric structure of the site (aquifer thickness, lithology distribution, heterogeneities, etc.), physical and chemical processes involved at the site (recharge/discharge, evapotranspiration, etc.), and boundary conditions imposed on the model.

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4. Is the type of model specified? (Recommended)

5. Is the area to be studied defined? (Required)

6. Is model verification specified? (Required)

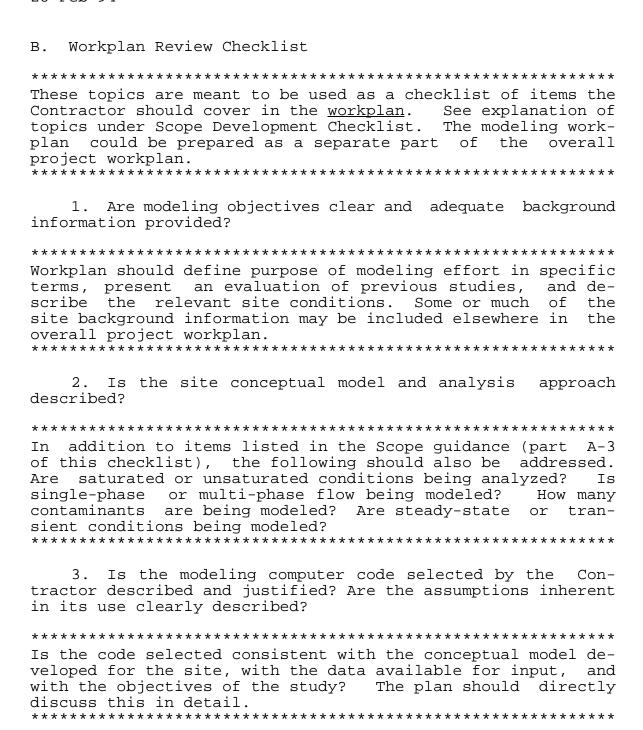
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7. Is calibration required by the scope? (Required)

the site is currently being stressed (e.g. by an extraction system), calibration should be to prestressed conditions data are available. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Is a sensitivity analysis specified? (Required) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* The scope should require the Contractor to determine the effect varying model parameters has on model results. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 9. Are scenarios to be evaluated described? mended \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* If the designer has specific modeling scenarios in mind they should be described in this section. If specific scenarios are not included, the objectives of the modeling effort MUST be explicit to allow the Contractor to determine appropriate simulation scenarios. Is a modeling workplan specified? (Required) This would be part of the overall project workplan. format specified? See companion checklist for suggested topics/format. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Modeling report required? (Required) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* This report would be most appropriate as a technical appendix to the overall project report (RI report, PA/SI report, etc.) rather than a separate submittal. A format should be

specified. The scope should discuss the types of graphics, etc. that will be required. A suggested report format is discussed in Chapter 9 of Applied Groundwater Modeling: Simulation of Flow and Advective Transport, by Anderson and

Woessner, Academic Press, 1992.



4. Is a code validation history provided?

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This is most applicable for proprietary codes or for codes not previously encountered by the USACE technical staff. Has the code been verified against analytical solutions? Is a benchmark or other test provided to verify proper installation and operation on the user's computer system? Even if a widely accepted model is proposed, if the code has been modified to any extent, for example for graphical output or simulation of site-specific processes, it must be fully validated and documented.

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5. Is the model geometry described?

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6. Are model input parameters described?

- 7. Are boundary conditions defined and justified?
- 8. Is the calibration procedure described?

At a minimum this should include comparison with field data, including water levels and contaminant concentrations (for transport modeling). This should also discuss the procedure to be used for sensitivity analysis.

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9. Is a procedure described for dealing with uncertainty in input data?

10. Are the proposed scenarios described in detail?

11. Is the modeling report described?